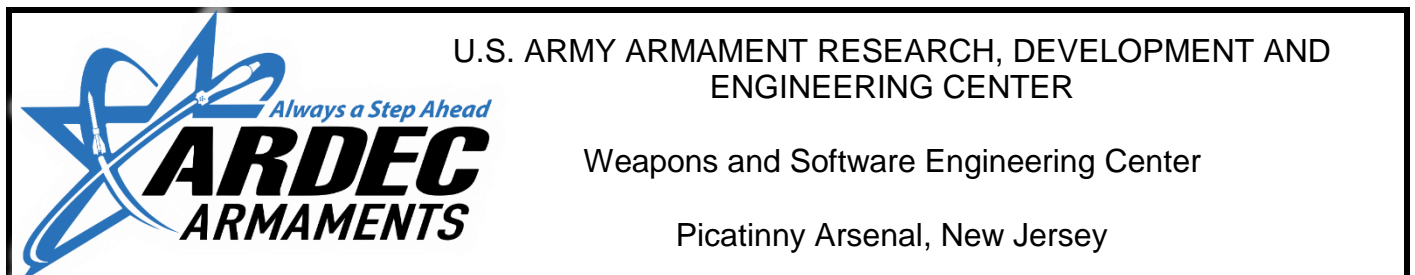AD

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Technical Report ARWSE-CR-16004

TACTICAL APPLICATIONS (TACAPPS) USER DESIGN WORKSHOP ANALYSIS AND FINDINGS REPORT

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November 2017

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14. ABSTRACT

As part of the Tactical Applications (TacApps) effort to design a highly user-friendly, relevant, and capable software system for the common operating environment (COE) v3, engineers at the U.S. Army Armament Research, Development and Engineering Center, Picatinny Arsenal, NJ, Weapons and Software Engineering Center, devised and facilitated a two-day design workshop at 1st Armored Division headquarters in Fort Riley, KS. The workshop consisted of several exercises designed to uncover the natural tendencies, viewpoints, terminology, and workflows of target users performing specific tasks. A total of 46 warfighters were included in the exercises). The TacApps team was able to gather significant insight through virtue of the design session. This insight heavily influenced the further design and development of COE v3 software for Mission Command systems.

15. SUBJECT TERMS

Tactical Applications (TacApps)   Command Post Client (CPC)   Command Post   Design   Common operating environment (COE) v3   Mounted computing environment (MCE)   Command Post Computing Environment (CPCE)   Workshop   User jury   Software design   Human factors

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ACKNOWLEDGMENTS

EXECUTIVE SUMMARY

Bottom Line Up Front

The Tactical Applications (TacApps) design team held a two-day design workshop with Soldiers at Fort Riley, KS, on November 2 and 3, 2015.

The goal of the workshop was to elicit user feedback to help guide and refine the design of the TacApps system. With a total of 46 participants (made up of 40 unique participants, as some Soldiers stayed for multiple sessions), the TacApps design team was able to gather a significant amount of user insight. Special thanks are due to the Soldiers of the First Infantry Division (1ID) and brigade staff for taking time out of their Command Post exercise (CPX) to help steer future U.S. Army systems development.

Sessions

Two days of sessions were conducted in order to collect feedback from both division and brigade level personnel.

- Day 1: session with 1ID division participants held at the division headquarters at Fort Riley. Sixteen participants left their CPX event to join in 2-hr design sessions, and some stayed for multiple sessions.

- Day 2: session with 1ID brigade participants held at the Mission Training Center school house. Twenty-four participants left their continuing CPX event to join in similar 2-hr design sessions, and one stayed for multiple sessions.

Topics

The sessions focused on the user interaction topics in this section.

Roles and User Identities

Develop user-facing terminology with users who are familiar with command and Control Systems (C2) but are unfamiliar with TacApps and the common operating environment (COE).

Language of Collaboration

Develop a role-based model ensuring the user interface (UI) displays data in ways that are intuitive to Soldiers and prevents cognitive overload caused by screen clutter.

Product and Workspace Management

Elicit user input on management of live, collaborative products versus traditional models and impacts on language, labeling, training, and workflows.

Activities

In addition to an introduction to the TacApps program, each design session incorporated a variety of activities that include:

- Responding to short video clips depicting software interactions.

- Completing surveys and performing card sorting exercises.

- Annotating handouts with design sketches.

- Providing candid feedback in small group sessions.

Structure

The design team was structured into facilitation roles.

- **Group Guides** – steered activities and discussions.

- **Scribes** – recorded the Soldiers' answers and comments.

- **Leader Facilitator** – introduced and explained each new concept.

User Feedback

The two day workshop yielded many insights. Several major themes that received broad consensus from the Soldiers included:

- Validation of the TacApps collaboration model that includes a shared view and an individual view of collaborative data and visualizations.

- Similarly, the basic TacApps ownership model was affirmed by participants, though many feature requests were made to extend the UI visibility of ownership on products and data.

- Many users believed that ownership should stop at the board level and not extend to visualizations or data.

- Voice was broadly considered to be an integral part of active collaboration.

- Several data-model level feature requests were made, including a running history of which users have accessed products as well as a "who/when" history for changes.

- Participants want a UI that adheres closely to Microsoft® (and other common web UI) conventions.

- TacApps will need an embedded spellcheck function so users don't have to copy out to Microsoft® Word.

- Users rely heavily on search and need advanced searching tools to support that primary navigation.

- Users expect TacApps to orient them to their unit's echelon within their task organization (org) and provide easy navigation to products owned by units above and below them in this hierarchy.

- Mounted users need the full suite of collaboration tools in order to participate in briefings and other collaborative activities to the highest degree possible.

- Three-dimensional (3D) maps are not used collaboratively and are seldom used at all by the 1ID, a predominantly ground troop force.

- System interoperability remains a primary pain point for users. Moving data between […], AFATDS, FBCB2, and DCGS were all mentioned many times as problems.

- Users expect a family of social media-style interactions, including the photograph identification of users, online presence, and tagging.

- The participants expressed such a broad range of ways that they think of collaboration that it conclusively justified conducting these workshops to ensure that TacApps designs a model that combines the best of different concepts into one that will best meet existing user expectations.

Next Steps

The TacApps program is in the process of decomposing the feedback from this workshop into modifications to existing design documentation where appropriate, and into information that will be used to shape required design concepts that are currently less mature. This will help to make certain that the system UIs and overall user experience of not only TacApps, but also Mission Command COE v3 systems in general will be built to include design patterns and human-computer interaction expectations revealed by the interviewed Soldiers from these sessions. The program also plans on conducting subsequent follow-up workshops and TacApps system user juries that place real, working software in front of the same 1ID participants for evaluation, and provide tangible evidence as to how their early user involvement has helped to noticeably influence the design of the system.

DETAILED REPORT

Goals

The TacApps design workshop was designed to solicit **actionable** feedback from users. The workshop's three session topics were chosen to prioritize the areas in which user input would most immediately impact design direction. The three topics, and their contents, were selected so that:

- The central design questions in the topic are testable.

- Answers to those central design questions are:

  - Crucial to the overall usability of TacApps.

  - Timely for current development efforts.

Topics

This section of the report outlines the three session topics used in the workshop.

Roles and User Identities

How users think of themselves and others within a highly collaborative system like TacApps shapes their expectations and effective use of the system. The goal of this topic was to understand the user's current and preferred perceptions of themselves within a system context as well as the labels they expect the system to use to define their identity and the identity of others across different contexts (such as login, finding and being found, and forensic investigation of product changes).

Language of Collaboration

How users understand collaboration and its many possible definitions also impacts their use and interaction with the system. While a high-level goal of this topic was to vet the current collaboration model design, this exercise also sought to reveal participants' workflows, real-world collaboration types, and approach to collaboration in general. Activities within this session informed the language and presentation that TacApps will use in collaborative contexts.

Product and Workspace Management

In a large-scale collaborative system, potentially thousands of users will be creating and using, storing and labeling, searching for and finding many products. The goal of this topic was to determine preferred or potential organizational schemes that would span many units and would satisfy diverse workflows and standard operating procedures (SOPs). Activities were designed to reveal patterns in how the users organized their own products and expected to find other users' products. The session also uncovered expectations for naming, organization, and search capabilities (fig. 1).

TacApps design workshop team

Hosts and facilitator

Dexter rewer	Operations SME
Jim Bell	Operations SME
Janette Knittel	Designer

Guides

Dan Dekowski	Systems Engineer
Aaron Lieb	User Experience Lead
Josh Cauvel	Technical Lead
Anthony Kim	Technical SME

Scribes

Ross Arnold	Program Technical Lead
Jason Samuel	Technical Lead
Chris Doyle	Systems Engineer
Pat Forgione	Systems Engineer
Chuck Brown	Designer
Chick Agnew	Designer
Lauren Grim	Designer

Support

Tim Zirkel	Army Program Office
MAJ Jacobs	Army Program Office
John Raletz	TRADOC
LTC Ayson	KMO 1ID
LTC Slagle	1BDE Dep CO

Note: Subject matter expert (SME), U.S. Army Training and Doctrine Command (TRADOC), Lieutenant Colonels (LTC), Knowledge Management Officer (KMO), 1st Brigade Deputy Commanding Officer.

Figure 1
TacApps design workshop team

METHODOLOGY OVERVIEW

The methodology employed in the design workshop was developed using a combination of standard user experience design activities, as well as time-tested experience, with the unique challenges presented by eliciting user feedback in a military environment. For example, in open

discussion groups and user juries, one or two highly opinionated or particularly vocal subjects can easily dominate the direction of the entire room's conversations and feedback. Other variables such as rank, seniority, and newness to the organization are also contributing factors that can result in some subset of the group receiving an unbalanced amount of attention. To mitigate this dynamic, the design team chose the paradigms outlined in this report.

Focused Small Groups

Each session's participants were organized into small groups comprised of one or two Soldiers, a group facilitator, and one or more scribes. Each topic was preceded by an explanation of the key TacApps concepts, an introduction of the new batch of Soldiers to the workshop team, and, finally, a brief overview of the design issue types being focused on during the session. Each activity was then conducted at the individual table groups, such that four different tables of carefully-balanced user pairs conducted each one simultaneously. This small group methodology maximized the amount of relatively unique feedback that was gathered. Similarly, it also ensured that individual participants' rank, conversation patterns, job functions, and the table facilitator's style did not have an outsized effect on the workshop results.

Card Sorting

A technique called "card sorting" was used that allowed the design team to very rapidly present participants with a range of options for combining and prioritizing the cards. The design team used card sorting in several different activities during the workshop. Card sorting addresses the time inefficiencies of asking users to create unique answers, and narrows the range of feedback gathered, for insights that are actionable and useful. This also allows the scribes to note not only what the participant's final "answer" was but to also observe their thought processes and behaviors as they arrived at those answers.

Limited Exposure

Finally, the design team used a technique called "limited exposure." A common problem when demonstrating software systems to users is the breadth of understanding that they must gain in order to provide specific feedback. Time is wasted and findings are often vague. Using quick videos and cards instead of real software allowed the design team to focus on a small subset of the system, carefully removing any details that weren't crucial to the concepts being investigated (fig. 2).
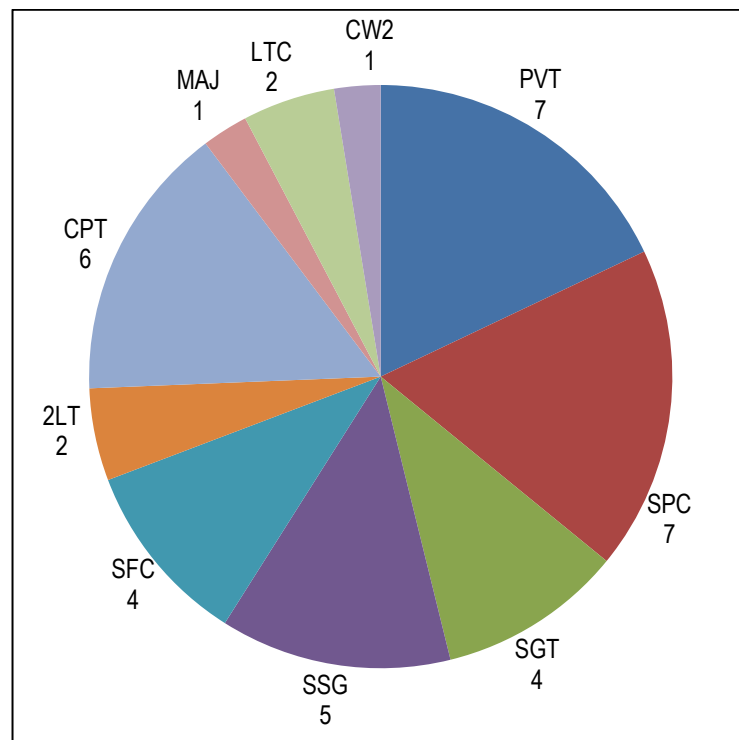

Figure 2
Participants and the design team at 1ID headquarters

PARTICIPANT DEMOGRAPHICS

The design workshop was attended by a diverse mix of Soldiers from both the division and brigade. The demographic data in this report was gleaned from surveys completed by the participants. This information provides helpful background context for the TacApps design team to better understand the responses received during the workshop. Note that not all counts total the correct number of participants, as some Soldiers didn't provide answers to all survey questions.

Participant Ranks

By rank, participants ranged from Privates (PVT) to LTC, with counts indicated in figure 3. This spread represents an excellent diversity of ranks within the division and brigade sessions, yielding insights from many different perspectives on SOPs, workflows, and collaboration.

Note: Major (MAJ). Chief Warrant Officer (CW2), Specialist (SPC), Sergeant (SGT), Staff Sergeant (SSG), Sergeant First Class (SFC), Lieutenant (LT), Captain (CPT)

Figure 3
Diversity of ranks within the division and brigade sessions

Mobile Operating System (OS) Favored by Participants

The participants reported the OS used on their personal (non-Army) mobile devices. The majority of participants chose iOS® (Apple Inc.'s operating system) devices when given an option (fig. 4). This count, while not a strong consensus, reveals a preference for iOS®, which the TacApps design team can mine for reusable design patterns (in addition to Microsoft®).
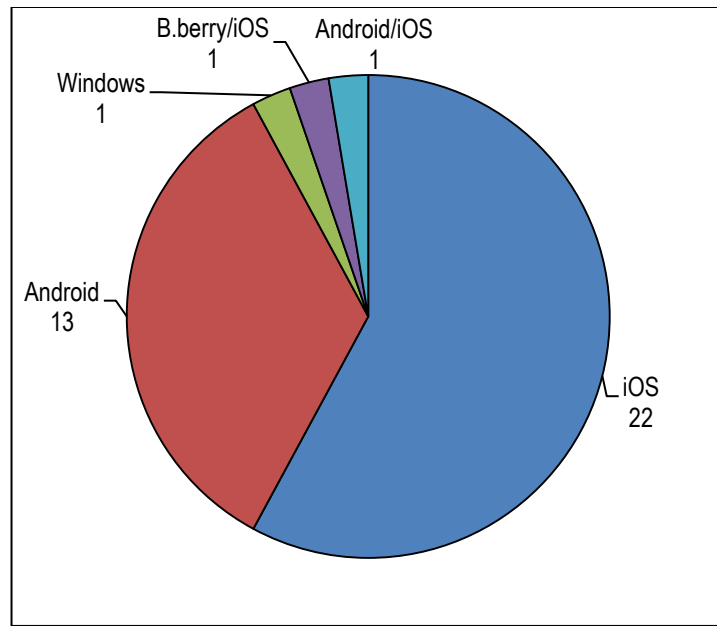
Figure 4
Mobile OS preferences

Participant Ages

The participants' ages ranged from 19 to 43, with a peak in the 25-and-under category. This is a decent spread of ages, though there is an obvious peak among Millennials (fig. 5).
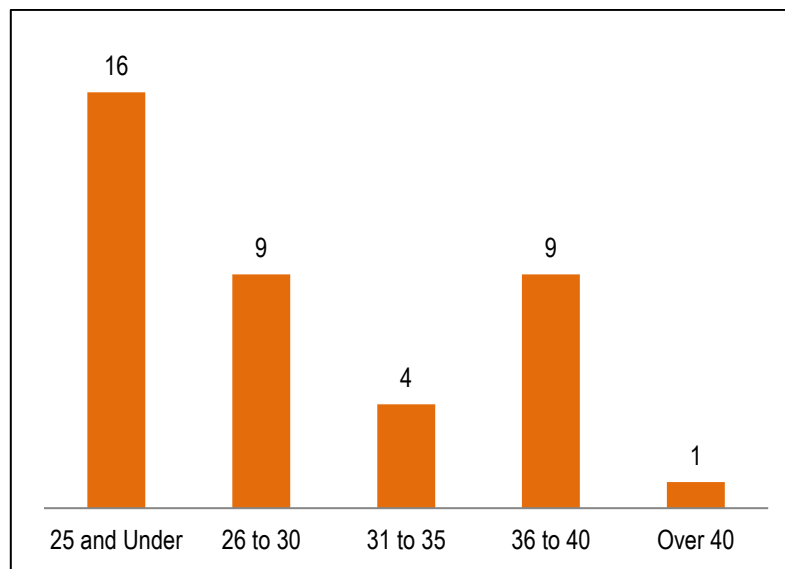
Figure 5
Participant age range

It is presumed that some of the social-media-style functionality that was requested comes from within the youngest age bracket. However, those requests were echoed by the more experienced/higher ranking participants as well, one of whom remarked "the Army is a young place."

Participant Education Levels

The education data collected from the Soldiers surveyed indicates that the majority had either already earned a higher education degree or were possibly working on completing one (fig. 6).
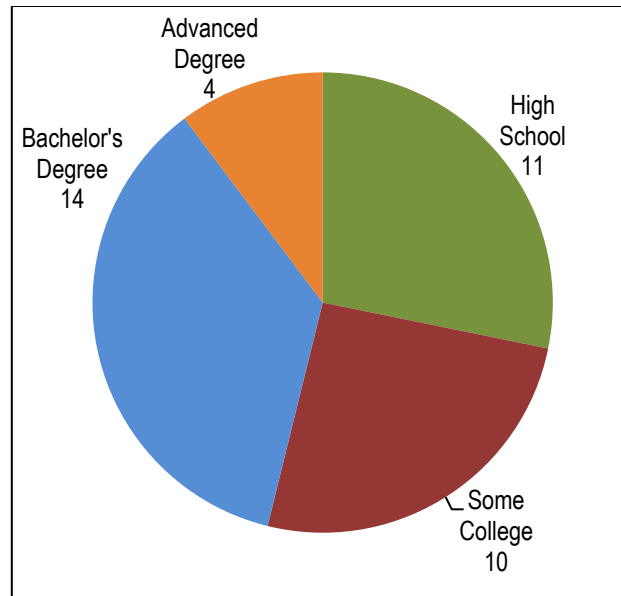
Figure 6
Participant education levels

Participant Command Post of the Future (CPOF) Expertise

The participants rated their CPOF expertise. There is a large number at the lower end of the expertise curve. This chart is particularly interesting when considered in conjunction with figure 7, in which the participants rated themselves as generally very technically advanced.
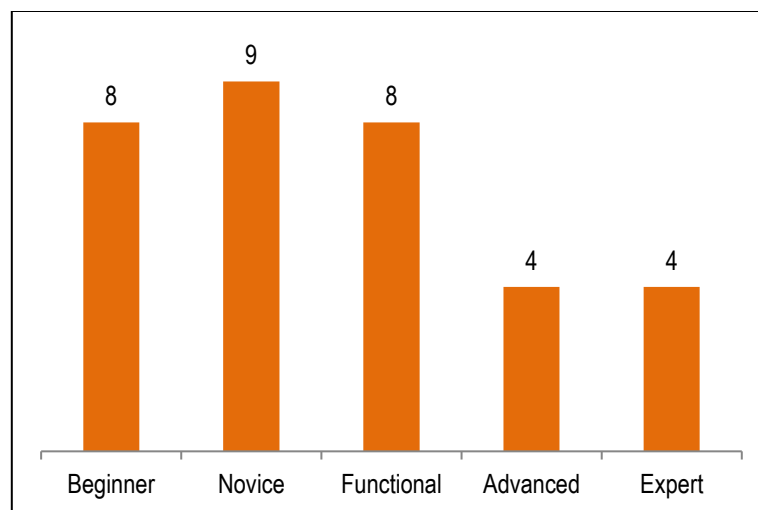
Figure 7
CPOF range of expertise

Participant Technical Expertise

Overall, the participants ranked themselves as being technically proficient. The confidence that the participants indicated in their general technical prowess did not extend to CPOF mastery, as seen in figure 8.
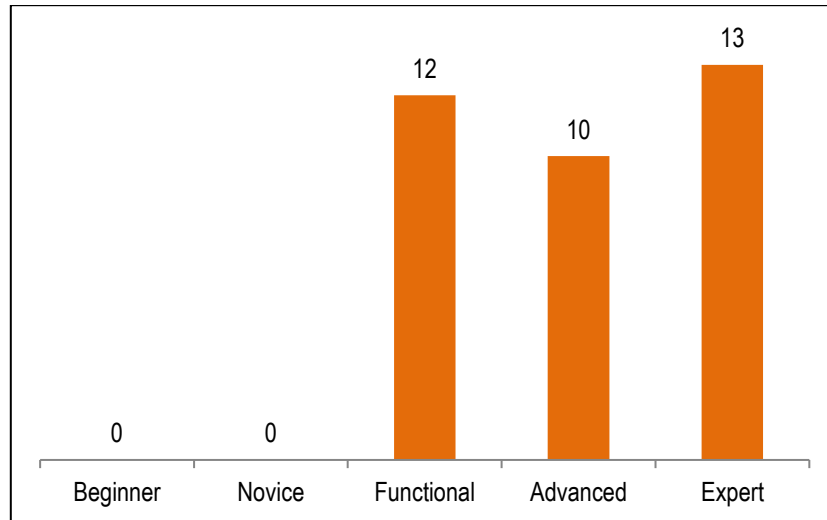
Figure 8
Technical level of expertise

WORKSHOP FINDINGS

Session 1: Language of Collaboration

The TacApps design workshop took place at Fort Riley on Tuesday November 2, 2015, from 13:00 to 14:30. This session covered roles and user identities.

The design workshop was separated into three sessions: (1) language of collaboration, (2) roles […], and (3) product management. Each of the three sessions was run each day, such that there was a total of two language of collaboration sessions in total, etc.

Each session began with room-wide introductions led by operations SMEs, followed by a brief TacApps system overview, presented by the facilitator. In addition to session-by-session detailing of the information gathered, this section includes high-level findings (figs. 9 through 11). All quotes from workshop participants have been anonymized to protect the Soldier's privacy.

- Users want familiar names, not made-up terminology.

    - "The army's a young place, so if we can use a 'wall' like Facebook, something from outside the army, that would be good."
    - "Stick to language you can find in social media; everyone understands that."
    - "(The system) has to be user-friendly on all levels; keep it simple, use everyday terms."
    - "Army dudes might not understand words like 'unique'."

- TacApps should not use call signs.

    - "I'd only use call signs on the radio."
    - "Call signs are for radios only and when you're deployed."
    - "Some of us don't have call signs and some may share call signs."

Figure 9
Findings, terminology

- Users want to review a history of who has recently looked at products they own.

    - "I want people to see it if I use it, and retain history."

- Users want to know the owner(s) of a product.

    - "(I'd) like to see a list of most recent changes; a last touched/modified history…"
    - "If I'm the owner of the product, then I need to know who needs it so I can tailor it for the other users. If someone needs my product specifically, I'd like to know who's looking at it."

- Last modified who/when value on products.

    - (User) says a last modified value would be useful to help tell the authoritative data piece from a duplicate. (It would include) the time it was changed and who did it. (User) says this would be helpful at the 'visualization and effort' level, but not at the data level.
    - "I don't need comments on why they changed it as long as I can see who/when/contact info for them."
    - "I'd like to see last modified by. Attach their username to that comment."
    - "When he changes my overlay, the system should track who made the change."
    - "That way you wouldn't have to show a shift change brief."

Figure 10
Findings, data presentation needs

- Integrated voice is a crucial element of collaboration.

  - "If we're in separate locations, we'll have a daily scheduled working group where we use common map and voice comms. For unscheduled meetings, we generally start in chat or merc chat, highlight something on the map and keep chatting."
  - "The way (I designed my user name card deck) is like Ventrilo. Ventrilo lists all (users). You can look and find and talk."
  - "Even a hyperlink to contact that person or a VOIP number would be good."

- The 3D maps are not used for collaboration; they are used in very limited circumstances like line-of-sight analysis and planning.

- Users like the idea of temporarily granting control to someone else during a real-time, active collaboration and had many other suggestions on how permissions could be made easier to use.

  - "Permissions are powerful but people don't understand them."
  - "You don't want issues where only you can open a shared document and it stops someone else opening it, but you want editing permissions."

- The ability to quickly and easily work with other users both directly and indirectly through seeing their work is desired.

  - "(It would) be cool to have favorite users. Click on them and boom – see their stuff or talk."
  - "Somehow I want to know what everyone else is doing."

Figure 11
Findings, use of collaboration

After introductions and the TacApps overview, participants began the language session with a brief video on the TacApps concept of data/work-product ownership. Participants selected as many of the answers (fig. 12) that they felt applied.

I assume that these rules apply to a map that I find in a folder:
(Mark as many as you want).

☐ "I own it"

☐ "I don't own it"

☐ "I can open it, pan/zoom it, and turn layers on or off"

☐ "I can't really use it until I ask the owner for permission"

☐ "If I change the location on the map, it'll mess someone up"

☐ "Bob, Joe, and Major Smith are looking at a different view of the same map"

☐ "Nobody knows if I use it or not"

☐ "Someone else might see what I'm doing, but they won't know who I am"

☐ "The map will say who it belongs to"

☐ "I can add data, like an Event, to the map"   1A

Figure 12
Map checklist

The participants' responses are detailed in figure 13. Overall, the data suggests that participants' expectations generally aligned with the current TacApps ownership model. Only one participant, for example, believed he owned a product simply because he found it in a folder. The majority expected they did not necessarily own that product but would be able to open it, navigate within it, and use layers. These expectations are in line with the current design. Since only one user expected that navigating the map location would "mess someone up," the data reveals an affirmation of the current default product version, which is to include live data capable of rich collaboration with a severed view state (in the style of the CPOF clone).
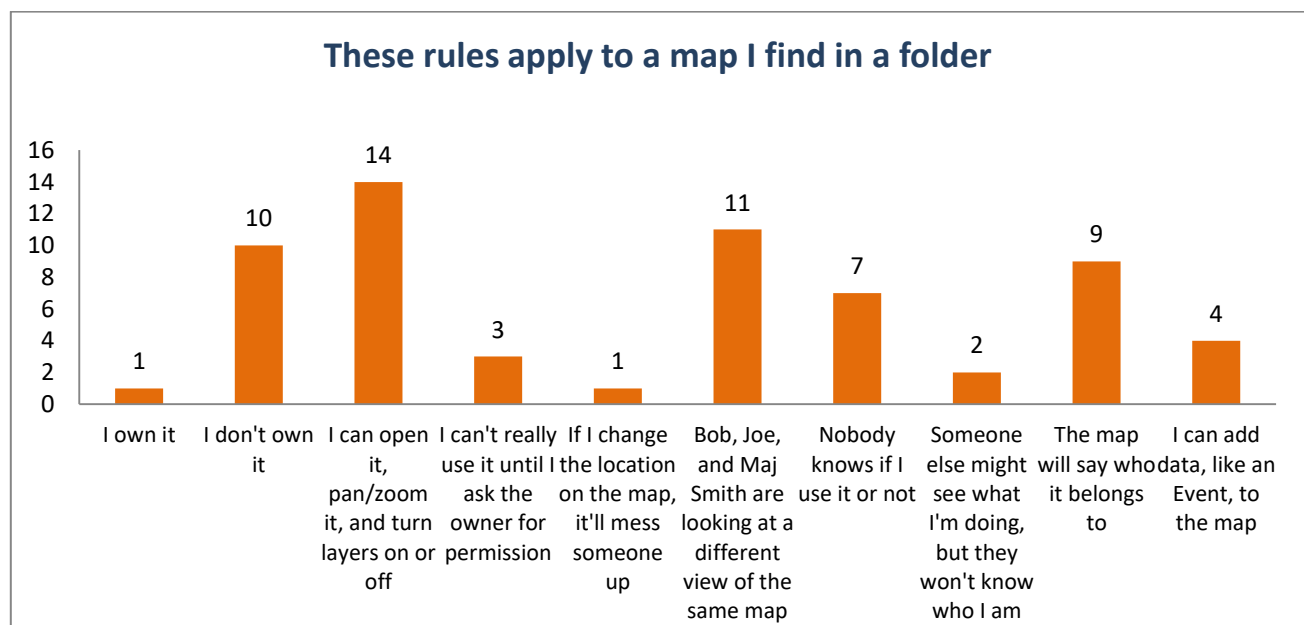

Figure 13
Compilation of map usage data

Users showed more uncertainty about whether non-owners can add data to the map; however, that indicates a need for clarifying this aspect of the TacApps ownership model.

Next, participants watched a brief video on the TacApps concept of a collaboration/composition board. Participants circled answers (fig. 14) that matched their understanding of how boards should work. This card revealed the Soldiers' ideas of the basic relationships of collaboration.

Circle the best answer to complete each statement:

1. Joe and Bob   *are*   /   *are not*   collaborating.

2. Bob and Major Smith   *are*   /   *are not*   collaborating.

3. The three of them   *are*   /   *are not*   collaborating.

4. Major Smith   *needs to know*   /   *doesn't care*   that someone is looking at / using a board he owns.

1B

Figure 14
Basic understanding of the usage of the term "collaboration" within CPOF

Analysis of these responses indicates that participants were generally more likely to answer affirmatively (basically meaning that some groups of the video's users were collaborating), rather than negatively (fig. 15). However, there was not a strong consensus for most questions, which illustrates the fundamental differences in how individuals view collaboration. For some participants, the events in the video met their definition of collaboration, while others saw them differently. A perennial challenge of meeting the expectations of users of a collaborative system is addressing the myriad ways that collaboration can be understood.
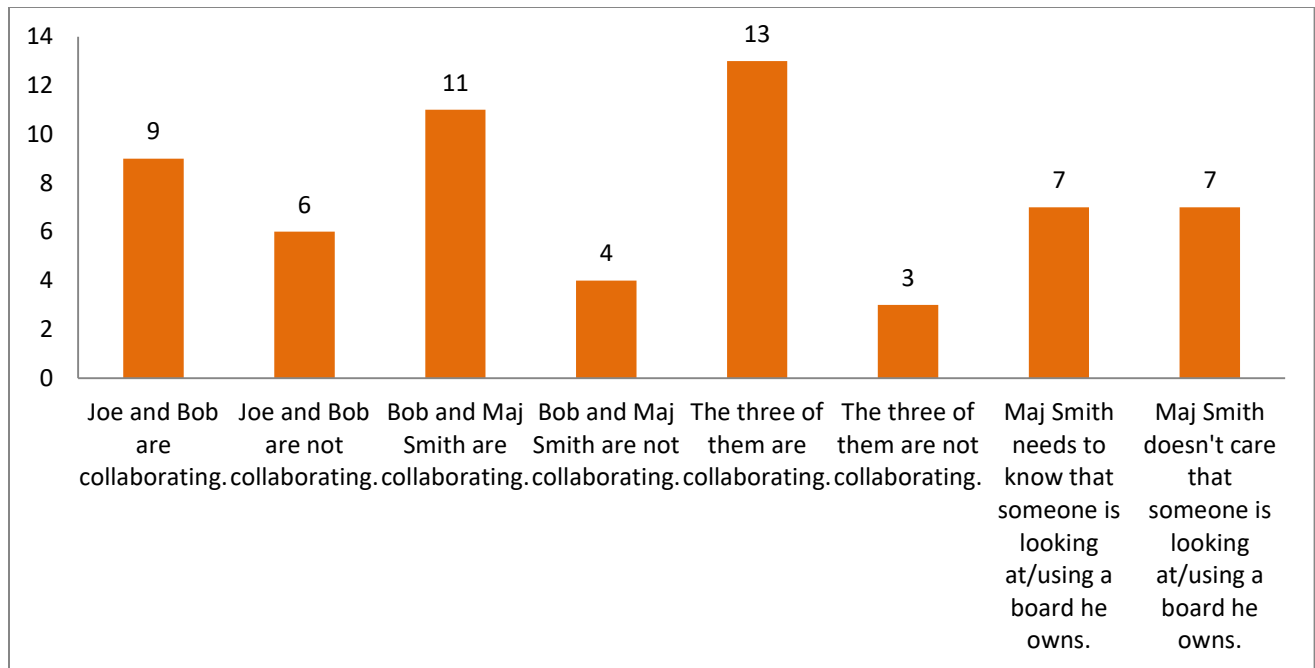
Figure 15
Statements that describe map collaboration video

Next, they filled out a questionnaire (fig. 16), selecting as many answers as they thought applied. This card revealed more specifics about how ownership concepts would apply in a collaborative workflow. The results are shown in figure 17.

Figure 16
Questions indicating how ownership concepts would apply in a collaborative workflow

Figure 17
Results of how ownership rules apply to a board found in a folder

Next, participants watched another brief video on the TacApps concept of visualizations with two view states: a shared view and an individual view. Then, they circled as many terms for the two view states as they liked on the questionnaire (fig. 18), which revealed the participants' overall terminology preferences. The results are shown in figure 19.

Figure 18
Terminology preferences
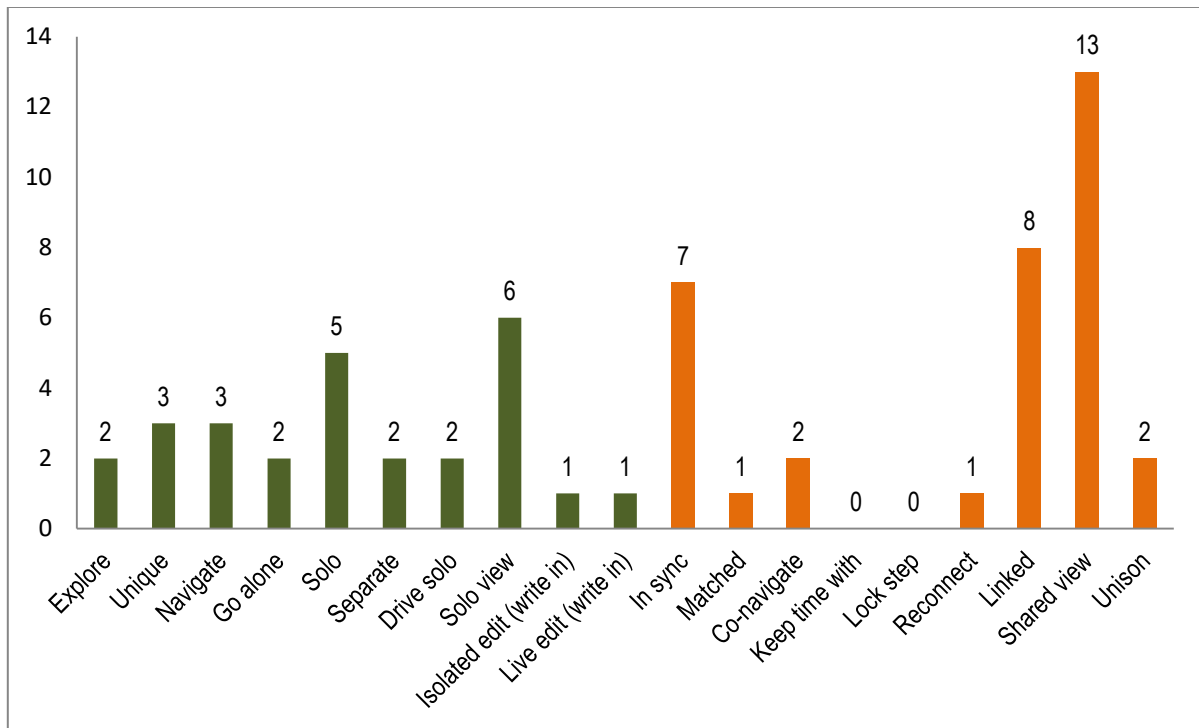
Figure 19
Naming of individual versus shared views

Next, the TacApps design team introduced the concept of onboarding, a software design concept that orients new users to a system's tools and interactions. Participants viewed examples of various onboarding methods used in other contexts (websites, development tools, and social media) and then answered which revealed the most important, initial tools that TacApps must deliver to new users (fig. 20). The results were weighted based on the order in which the items were listed by each user.
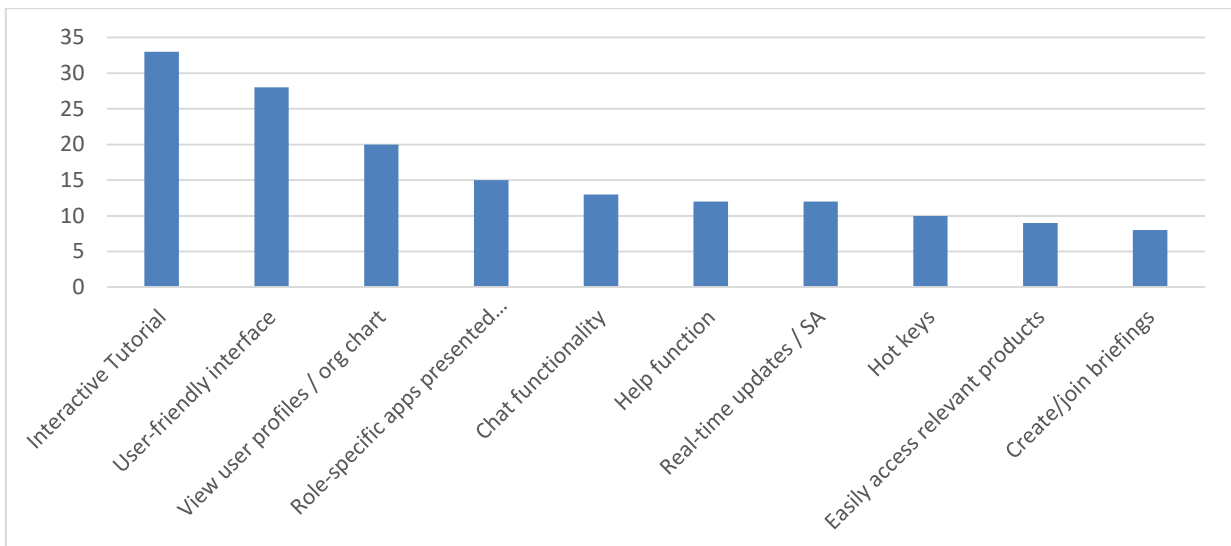
Figure 20
Most important initial tools

Participants also filled out card 1F, which gathered information about which elements of the onboarding examples seemed helpful or not helpful to the Soldiers in a TacApps context (fig. 21). Classroom-wide discussion followed, and participants were encouraged to explain the "why" behind their answers.
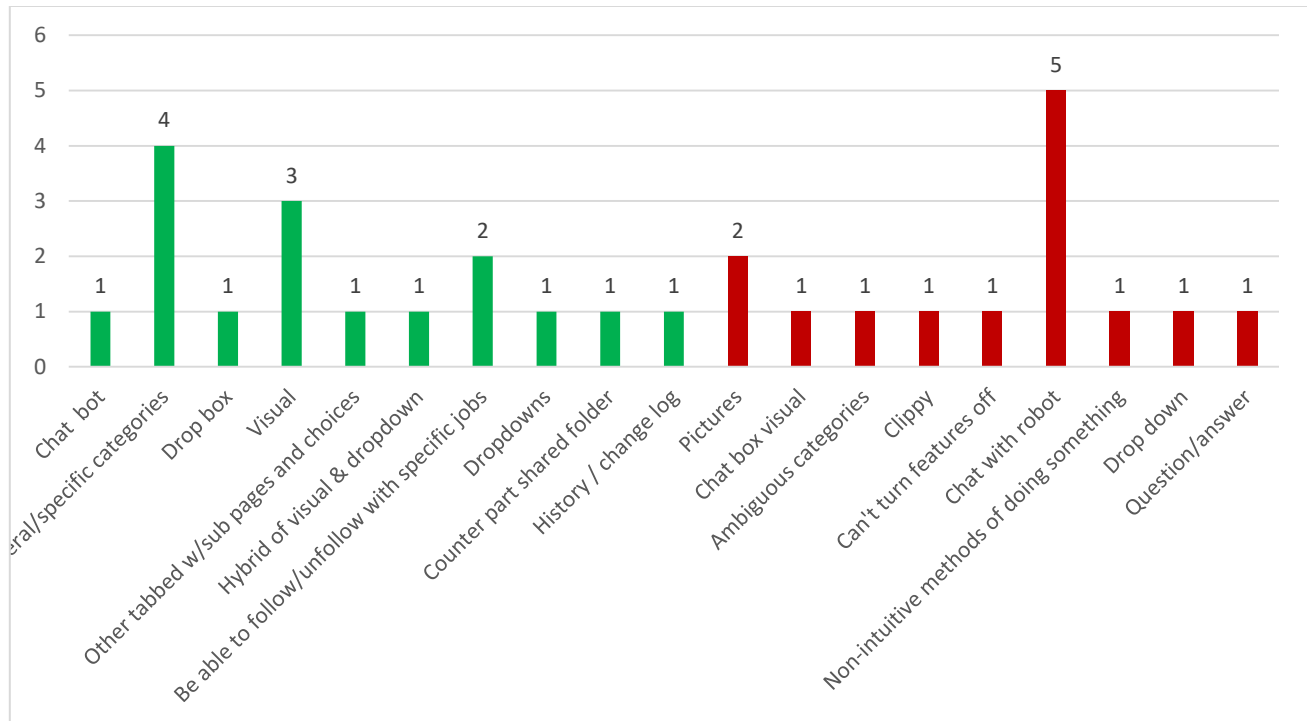
Figure 21
Onboarding example likes and dislikes

Session 2: Roles and User Identities

The TacApps design workshop was held at Fort Riley on Tuesday November 2, 2015, from 13:00 to 14:30. This session covered roles and user identities.

The goal of this session was to clarify the best method of identifying users in the TacApps system. The sessions led the users through a variety of activities aimed at presenting use cases in which the user name is important and asked the users to identify traits and characteristics required of the user name. The users were presented with 10 traits that included: (1) rank, (2) first name, (3) last name, (4) middle name, (5) role, (6) staff function, (7) warfighter function, (8) call sign, (9) special skills, and (10) asked them to create a user name. After presenting the use cases, the users repeated the exercise to check if there were any differences in their opinions (figs. 22 and 23).

Online User Presence

- Knowing whose eyes are on a product in real time is necessary during briefings, and helpful but not necessary in other contexts.

    - "If I'm the owner of the product then I need to know who needs it so I can tailor it for the other users. If someone needs my product specifically, I'd like to know who's looking at it."
    - "Knowing who's actively looking at your work-product like in Adobe Connect is not totally needed. In briefing yes, but not otherwise."
    - "Presence would be great here - if they're at the desk or not. Like on Outlook."
    - (User) expects to see a user's presence if they're online – grayed out for offline and green for online.

Identification and Tagging

- A number of users favored the use of photograph identification for each user, others thought of this as optional and not sufficient to fully identify others.

    - "Picture with a name would be huge."
    - "A picture would be helpful. Rank, last name, role under the pic. We do a lot of seating charts and could narrow down by role."
    - "It would be helpful to put a face to the name plus a role."
    - "It could come from the CAC card pic."
    - "If I saw actual pictures, it wouldn't be enough to identify a person."
    - Rank and name, and the picture (not required) could also use a rank symbol instead of face.

- Users rely heavily and primarily on search over other navigational techniques when searching for unfamiliar and infrequently used products. Also they like tagging because it enriches search.

    - "I don't need to see all users because I have search functions."
    - "(User) would be interested in 'I'm an expert in (building out the COPs)" type expert tagging."
    - "There's value in taxonomy – in tagging things CUOP, FUOP, because search is incredibly difficult. Searching, with filters, across the entire system of apps would be incredibly valuable. I would say that should be a requirement, saying that as a knowledge manager."
    - "Outlook is searchable by name, I want to be able to search by various functions: 'all people in BRAVO Company' (dropdown)."

Figure 22
Findings, social media expectations

- Users want a workflow that combines fast collaboration plus eventual 'official' approval to ensure trustworthiness of information.

    - "Initially, unit SOP (should dictate organizational workflows) to get grassroots appropriateness. Then, allow a system to push that (organizational system) out as a pattern that other units can adopt."
    - "At some point if you were able to take the draft and the certified person could approve it… it could be a workflow."
    - "I would like to see a feature where I can approve or deny additions/edits. That's how it is in AFATDS, through recommendations. For us, wrong information causes a lot of problems."

- Users want to take someone else's product to use as a head-start template, and then modify as needed.

    - In briefing, a common template should be shared with the subordinates.
    - Warfighter functions would create templates for their specific functions.

- Users want to label work products by status, such as 'draft.'

    - "While a product is still being built, no one should be able to look at it because they'll get false information."
    - "We need a way to clearly label a product as 'draft.' Near the classification border maybe."

- Users want a way to add things to products they don't own.

    - "If an owner doesn't put a layer on that, then I'd have to email that request. It could be up to 12 hours before I read an email, so requesting a layer or permission can take very long."
    - "He sends the changes to me, unless he gives me permission or lets me contribute."

- Users want the ability to easily save TacApps boards as PowerPoint presentations.

    - On copying and pasting with PowerPoint - "screen grabs on a paste board look like a 2 year-old did it."
    - "(I'm) doing SigAct briefs in PowerPoint, requested by my Commander."
    - (User's) unit has had to recreate entire CPOF products in PowerPoint.
    - (User) suggests we allow a user to type their role in immediately but then let the next level user (supervisor) verify/screen it.

Figure 23
Findings, workflow needs

There were eight Soldiers from the division who participated in this session. Another eight Soldiers from the brigade participated in an identical session on the next day.

Participants were given card 2A, which asked them to write down the user name they'd want to have in the TacApps system. This was followed by a room-wide discussion in which the Soldiers explained their reasoning behind their user name selection.

Next, the participants were given a series of 10 cards, each with a possible component of a TacApps user identity (such as role, rank, last name, etc.) and were asked to sort the cards: most crucial identity elements first, followed by less crucial elements, and unimportant elements were discarded. This activity encouraged participants to think of how other system users would best be able to find them.

For the next exercise, participants labeled and sketched on a printed handout (handout 2-1). This activity revealed the way participants expect the TacApps system to identify a whole range of U.S. Army users.

Then, participants were told that the TacApps system would have a list of each user's "most useful contacts." Participants were asked to design that list on handout 2-2: who would be on it, how would they be identified, and in what scenarios would participants find and use this contact information (fig. 24).
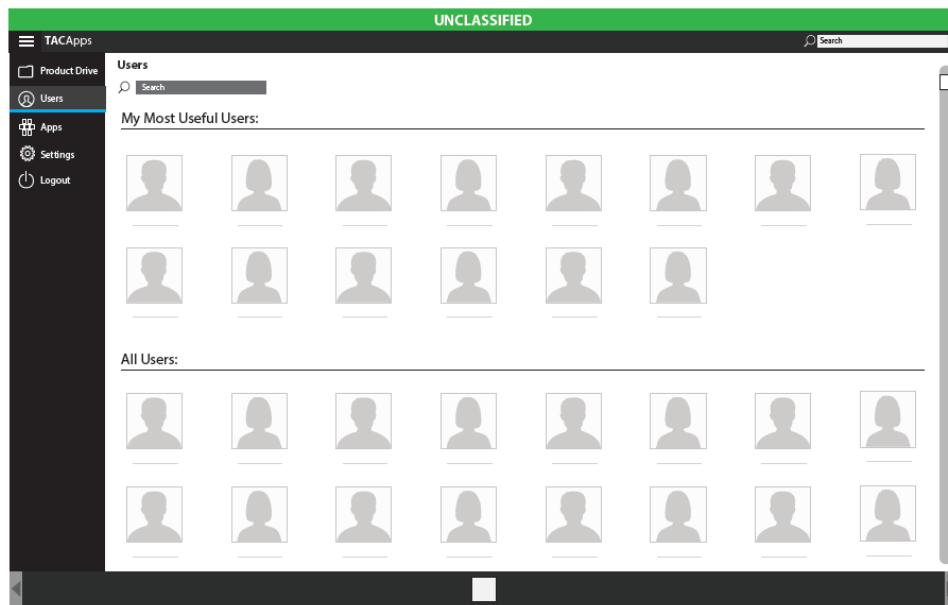
Figure 24
Most useful contacts list

Then, participants were given a blank card (card 2L). They were told that a controversial comment had been made on a piece of data in the TacApps system, and they were tasked with finding out who made the comment, how they would expect to locate the commenter, and what the system should provide in the way of identifying users in this context. This exercise revealed the participants' ideals for forensic discovery in TacApps.

Next, participants were given a series of four identities, each formatted differently (fig. 25).

~~John M. Smith~~

~~S6 from 1BN~~

~~Battle Captain from 2BDE~~

~~CG from Division~~

Note: Commanding General (CG)

Figure 25
Example user identities

The goal was to see how the participants would go about locating these people in TacApps. The TacApps design team facilitated this paper prototype navigation in real time with the participants – providing printed handouts of system menus and locations as needed and recording the participants' expected search paths.

For the final exercise in this session, participants were asked to return to the card sorting activity they completed previously: 10 cards, each with a possible component of a TacApps user identity (such as role, rank, last name, etc.). Once again, participants sorted the cards: most crucial identity elements first, followed by less crucial elements, and unimportant elements were discarded. By returning to this activity, the TacApps design team was able to compare each participants "gut reaction" to their more nuanced answer after completing several exercises about the different ways that user identities will appear in TacApps. Generally speaking, though individual users frequently changed the order of their answers, there was very little difference between the first and second card sorts when reviewed in aggregate (fig. 26). The card sort was followed by a room-wide discussion in which participants shared their insight about the design of TacApps user roles (fig. 26).
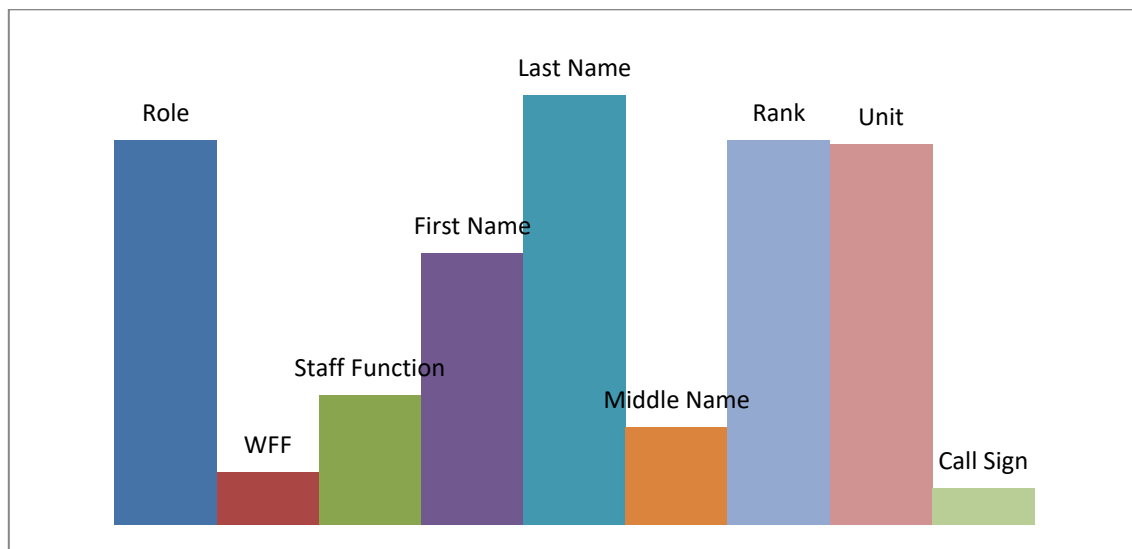
Figure 26
Role attributes, relative popularity – exercise results

Examples:

- **1AD G-2 ACofS MAJ Parker** (Division Intelligence Assistant Chief of Staff, Major Parker).

- **1/1AD BTL CDR COL Wayne** (Brigade Commanding Officer, Colonel Wayne).

- **1/1-1AD S-9 AN SPC Banner** (Battalion Civil Affairs Analyst, Specialist Banner).

Session 3: Product and Workspace Management

The participants were given a brief overview on product management in TacApps, specifically the concept and implementation of the product drive (where their work-products would be stored, organized, found, and created). They were shown a basic wireframe image of what the product drive might look like (figs. 27 and 28).

Users want their location in the task org to be the starting point for folder/product/person organization. Also, they want to easily be able to navigate one echelon up and one echelon down from their own.

- "I would like to see all the people doing logistics. Not just mine, but my division first, then like Outlook you can go to Global. But at first, the ones I contact the most. Why would I need to see a Fires guy?"
- On hierarchy organization – "One up, one down!"

Users want to name the folder of their other user contacts 'favorites;' it should be a combination of automatically added names and the ability to manually add/remove names.

- "Battalion people separate from my units like S1… but when I click S1 it bleeds out the people in there."
- "It would be nice if the system determined who I contact most (top 5, in the past 6 months, based on frequency), and add to my contact list."
- "Have people in your unit separated from higher ups because I'd get commands from them… like notifications. Then have other shops."

Users provided no strong consensus on how TacApps should identify them.

- "First and last. Easy to remember. My role is not as important."
- "Role is important whereas identity is not important."
- "Enlisted don't use first names. That's for officers. It wouldn't help me to see a first name in a computer."

Figure 27
Findings, information organization

Mounted/dismounted users require the full suite of briefing and collaboration tools.

- "For the mounted environment, it's incredibly important to have collaboration."
- "The biggest thing now is getting the soldier level, like at platoon, to put info right into the system directly, not swivel chair FBCB2 info and then enter it into CPOF."
- "We need to dialog and command from a mounted platform too, to give a briefing."
- "In a Bradley, I would be both sharing and the one briefing for things like route clearance."
- On briefing in a mounted environment - (mobile) commanders, G3s, S3s—it would be a great benefit to them. If the company was doing some sort of a sync, and had their platoons out, this would be a good way to communicate. Being able to notify the Battle Captain when (there is) an update is important."
- "The battlefield changes every minute. There is no front line. The lowest soldier is (only) equipped with cell quality radio. He can add an IED on site on his phone, and feed Brigade, Battalion, Division."

Figure 28
Findings, mounted/dismounted needs

The first activity asked the participants to label a TacApps folder that would be accessible only by them, not others. They were given a series of 10 cards, each of which contains a term (such as "my folder") or an element of a user identity (such as "last name") as well as blank cards for the participants to provide creative suggestions. They ordered the cards, as many as needed, as they would label their TacApps folder.

The next exercise (handout 3-2) asked the participants to sketch what they would expect to see under the TacApps "groups" menu item, how the folders would be organized, which method of separating the U.S. Army's many users into groups they would want to see, and what would be most helpful (fig. 29).
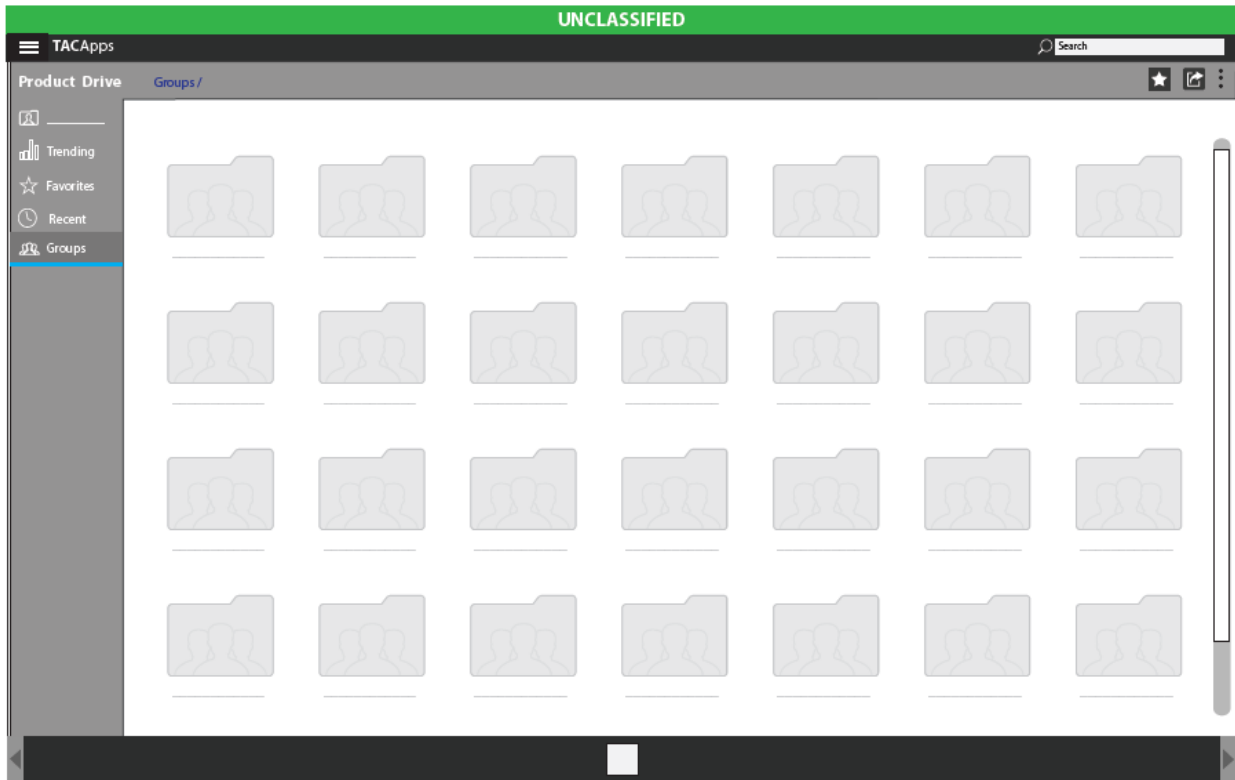
Figure 29
TacApps "groups" menu item example

Then, participants were asked about their current use of CPOF in order to provide background context to their answers throughout the session and to provide the TacApps design team with do's and don'ts moving forward. This conversation-based exercise yielded much information about the Soldiers' real-world workflows and system use.

In the next activity, the TacApps design team drilled down into the participants' CPOF usage, more specifically, information and product sharing.

Then, the next conversation drilled into the participants' expectations and understanding of how TacApps should handle authoritative data, such as a common operating picture (COP) map, or boundary graphics. This session yielded more real-world insight into the Soldiers' needs.

DESIGN AFFIRMATIONS

Individual View, Shared/View

The most affirmed design model was the individual view versus a shared view collaboration pattern. Even before the design was introduced to participants, many of them described their ideal functionality in a way that foreshadowed the design they would later be shown:

- "I wouldn't mind a preview when I click on a work product."

- "I want the ability to look at a different view. Default starts at the same reference for everyone. When I go in, I want to see the same view as Major Smith, but I want the ability to dork with it."

- "(It's) really nice to be able to move the map around without affecting the brief or who is working with the map."

- "In CPOF, we've had same logins battling workspace. In this third video, I like making changes that all see without impacting anyone."

- "I don't want them to be able to move my map whenever they want, but it would be useful for someone to be able to highlight or pan/zoom when they need to point out something."

Folder Design

The folder structure was broadly considered intuitive, even though there was a lot of disparity on which levels of U.S. Army hierarchy should be placed and where. The similarity to Microsoft® was considered a plus by the majority of participants:

- "I wouldn't mind a preview when I click on a work product."

Mounted

The folder structure was broadly considered intuitive, even though there was much disparity on which levels of U.S. Army hierarchy should be placed and where. The similarity to Microsoft® was considered a plus by the majority of participants.

Rather than being a secondary concern, participants expressed the desire to have a full suite of collaborative tools for mounted environments to attend and provide briefings:

- "As soon as you get on CPOF you're not mobile. You need to be mobile."

- "For the mounted environment, it's incredibly important to have collaboration."

- "In a mounted configuration, both passive and active collaboration are needed."

- "We need to dialog and command from a mounted platform too, to give a briefing."

- "For example, in a Bradley, I would be sharing the one briefing for things like route clearance."

- "On a computer, (this is) fine. Out in the desert, less is fine."

Briefing Concept

Early concepts for a briefing application have included functionality, such that a user who had placed his board in the shared briefing could make data changes to his local version of the board, confident that those changes (to live data) would be near-instantaneously included on the brief:

- "If you hear a CG give feedback during a brief, you want to be able to fix your products right away before they get to yours."

- "(It's important during a brief) to know whose eyes are on the brief."

- "Briefing requires a dialogue."

- "Briefing is really the only context you want to know if you're collaborating with somebody right now."

- "Active is briefing, it's dialog. Passive is sharing."

- "Some places, before the briefing starts, the group will replicate the brief to protect themselves from themselves. A frozen product before briefing can be important."

- A "who I'm sharing with" (banner of some type) would help to reinforce privacy when it says "nobody."

Storing Data in "My Folder"

- "(User) stores his products in his 'CPOF user,' not in shared products."

Folder/Groups Design

- "Go to groups and find HQ. Would then need standard role names, which would update if changed."

Insisting on Simplicity

- "Limitations are important. Keeping customizability to a minimum is key. For example, being able to turn friendly units red (just) because your division likes red (is a problem)."

- "But the systems don't do detailed staff planning because they can't replicate the precision of a mouse (for mounted)."

Tooltips for Instruction

- Tooltips would help the user. They prefer that type of interaction teaching within the application.

Attaching Chat/Email/other Messages to Products

- "Being able to share with another person to ask for feedback (is important)."

- (The user) describes: "A link to data would make it a lot easier if you could just send data to a distribution list then click on the shared locations and have it automatically open up."

Right-click Menus

- "Have a simple right-click with options like 'share product'."

Limited Need for Three-dimensional Map Collaboration

- "(The user) has never heard of any need to do live 3D collaboration from a mounted environment. He has seen tilting the 2D map to see terrain but has never used live 3D map collaboration at all."

- "(User) is not interested in 3D map collaboration capability."

- "(User) agrees that 3D is not necessary for collaboration."

- "3D (maps) don't get much use except for line of sight analysis requirements, and to appreciate 3D terrain during planning."

- "In a briefing you can get away without (3D functionality)."

- "I don't touch the 3D map. I don't see any benefits to it – the same with animation and time stuff; it has no added value."

Fixed Board Layouts

- "But I'll also like the new rigid layout of the board and how it doesn't let you lose things under things and get cluttered."

Ownership Basics

- "The people that we allow to alter (our products) is a very, very small list."

DESIGN CHALLENGES

Ownership Details

Many to most participants believed ownership stops at the board level (i.e., if one owns a board, they own everything within that board) and failed to understand the composability requirement that visualizations and data contained within a board frequently will have owners who are **not** the board owner. There was also a lot of feedback that permissions are difficult to discover/understand, and it is likely that a familiar and thorny design challenge needs to be overcome.

- "With a board (there are) only two answers: either you own it or you don't. If you own it, you can change it."

- "(I'd) like to see permissions stop at the pasteboard level – not go to the visualization/frame (map) level."

Personal Folder

While some participants appreciated the idea of a personal folder, some challenged its necessity.

- "I don't think anybody needs 100% privacy."

- "(I) see no reason why invisible, 'nobody can see it' privs would ever be needed. (I'm) okay with everybody being able to view everything."

Task Organization

Information and access organized around the individual's place in the task org was a near-universal request, but it remains unclear at the program level if there are resources to ensure that task orgs will be available to most TacApps users.

Need for Authoritative Products

- "Everybody puts stuff in the tree viewer, under shared products. It's starting to pile up. Why are there four COPs? There should be one! People are making templates…"

- "Every time you change a role, the system should red-border-big-asterisk REQUIRE that you confirm or update your phone number."

- "(A) last modified value would be useful to help tell the authoritative data piece from a duplicate. (It would include) the time it was changed and who did it."

Collaboration Ideas

General definitions of "what is collaboration" varied wildly, making it difficult to deliver a collaboration model that meets a majority of users' expectations.

- "I don't think they are talking/collaborating because they're just observing… It doesn't look like they're working together… (They are working together) if they are talking."

- "What does collaboration mean?"

- "Users are not collaborating because only one person is editing; the other users are only watching."

- "I think of collaboration as (a number of) people equally building something together."

- "Collaboration means you have the same rights."

System Interoperability

System interoperability remains a primary pain point for many to most users. Moving data between […], Advanced Field Artillery Tactical Data System (AFATDS), Force XXI Battle Command Brigade and Below (FBCB2), and Distributed Common Ground System (DCGS) were all mentioned many times as problems.

- "The biggest thing now is getting the Soldier level, like at platoon, to put info right into the system directly, not swivel chair FBCB2 info and then enter it into CPOF."

- "Are you guys trying to make (TacApps) talk to JCR or BFT?"

- "Whatever else, if what you develop can't talk/share to the other AMDS programs, it's useless. Also, individual programs (like) DSGS, AFATDS, JTR, etc., which operate in isolation defeat the concept of common operating picture."

User Identity

There was no clear consensus on whether TacApps users should login by name or role. Users need to find/collaborate with both individuals as well as people currently in roles:

- "First and last. Easy to remember. My role is not as important."

- "Role is important whereas identity is not important."

- "Enlisted don't use first names. That's for officers. It wouldn't help me to see a first name in a computer."

- "Some of us don't have call signs and some may share call signs."

- "Unit is critical; rank is nice to have."

Fundamental System Types

Participants weren't clear on the delineation between visualizations and data (for example, they didn't know what "efforts/folders" were), which makes it likely that they could remain confused by any system-level behavioral/interaction differences between the two.

- (User) doesn't think of efforts as data.

Product-centric Organization

Most users have an extremely product-centric view of the system (for products like the COP, etc.) rather than a people/group, date/time, or other organizational method. This method may not necessarily support a product-centric worldview:

- "You haven't mentioned staff roles once. You've mentioned high-level products like the COP (design team member noting the participant's focus)."

Adding to/Changing Unowned Products

Users want to be able to "push" products; to put a product in a place that they don't have ownership of, and then allow the owner to accept or reject those changes:

- "I don't want to have to ask permission."

- (The user) wouldn't mind others looking at a product he's working on updating so that they can provide real-time feedback; highlights aren't enough, but notes might be.

Workflow Needs

In general, users want many workflow tools that are currently not being designed:

- "I would like to see a feature where I can approve or deny additions/edits. That's how it is in AFATDS, through recommendations. For us, wrong information causes a lot of problems."

- "(The user) should be able to set this as a setting and get notifications. To get an acknowledgement once someone opens the board (like an email read receipt)."

- "If all can (see it), then everybody adds together. So maybe, check-out… like Sharepoint. A Shared drive with Sharepoint. Check the map in and out like a shared folder. Like a library."

- "At some point if you were able to take the draft and the certified person could approve it… it could be a workflow."

- "No watchers 'til I publish it. Closed environment. (This) avoids people getting wrong information prior to publish."

- (User) wants to be able to send products to a commander/etc… for a review before the final "publishing": "If no one can see it, just to make damn sure it's right before you publish to the world."

- "I talk to a box, not a person so (I have) no real problems with shift changes."

- "If there was a way, once someone put their fingerprint on it to change or view it, to see who and when, alerting the person who runs the product, it would be good. Not only who but why."

- "Show a screenshot of before and after of what the change is. Be able to see who made that on his role and battalion."

Next Steps

The TacApps design team will use the insights and feedback gathered from the design workshop to continue the TacApps design using understandable and familiar patterns. Affirmations of existing designs will help harden those concepts that made sense to participants, and places where the design concepts failed, to gain broad consensus will be re-examined. Also, the general knowledge of the Soldiers' workflows, pain points, and requirements will help to organize upcoming design work by user priority.

The TacApps design team is planning to revisit Fort Riley in the New Year, in order to follow-up on the Soldiers' design guidance with functional software.

In addition to cross walking the collected user feedback against existing design documentation, the TacApps design team will also compile a document of use cases that were described by participants. These use cases will be helpful tests of the overall TacApps design, ensuring that there is system-wide or app-based coverage for the actions and requirements described by the Soldiers.

Another document that can be generated from the analysis of the artifacts this session identified is a list of future application ideas for TacApps. The app ideas from participants are included briefly in figure 30 but will be investigated and described further in a separate document.

- Spot report app
- Event creator app
- Review and comment/track changes workflow app
- Task org manager
- Briefing app
- Running estimate app that feeds a Commander's situational awareness dashboard
- Shift change organizer app
- Automatic S2 ordering app
- Ordering app for cargo, supplies, etc.
- Route planning and navigation app that lets them follow the 'blue line' just like a phone's global positioning system

Figure 30
Participants' app ideas

CONCLUSIONS: EVENT LESSONS LEARNED

- The Tactical Applications (TacApps) design team is planning to revisit Fort Riley, KS, in the New Year, in order to follow-up on the Soldiers' design guidance with functional software.

- The paper prototype navigation didn't work. It was too unwieldy and required too much preparation in advance by guides who could only possibly do one at a time. It was hard to document after the fact. If this is ever done, it should be documented electronically so that the navigation path is recorded automatically.

- Facilitating the paper prototype activity seemed awkward, and it was difficult to extract the participant's thought process (products, activity 2, and handout 3-3).

- It was difficult sustaining a dialogue with the participants during this session, which was much too long, based on their limited feedback (products, activity 4).

- As with the previous activity, it was difficult to engage with the participants, hence the light amount of feedback (products, activity 5).

- Scribes should be given a standard paper type to write on – one that is easy to automatically scan after the fact.

- The people images on the handout folder icons were too light/washed out to be seen. An indelible marker or ballpoint pen should be used to make drawings and other markup easier to see on a scanned copy.

Survey

- Years of Mission Command experience question is vague.

- "Command experience? Is that DIV? I've got 20 years, I'll say that." – Participant.

- "Background wasn't clear. Needs to be crystal clear for the military; be specific."– Participant.

- Users didn't always know the survey was two sided.

- Did not include question that specifically asked for rank, forcing scribes to record this data separately.

- "Number of years you expect to serve" should have been requested to separate the practically-concerned from the theoretically concerned.

Presentation

- The onboarding slides were missing.

- Some participants weren't totally clear on "why" they were watching the movies.

- "Am I judging what that video explained?" – Participant.

- In activity 3, confusion was created by calling the collaborative example a battle update brief (BUB). In reality, a participant explained, a BUB has a formal update cycle, and is otherwise static, so the BUB work-product doesn't fit with the workflow described in that example. The participant recommended that it should have been called the concept of operations worksheet, which has a more dynamic updating rhythm.

- Some of the Soldiers were looking disinterested by the end of the introduction – maybe shorten it for next time or include visual aids.

APPENDIX
BACKUP DATA

Participant Quotes

- *"Yes, I'm excited about this s**t. I can't wait to talk to you guys." –*[User], during the introduction.
- *"There's an app that can do that in a second. This is 2015!"* --regarding a cumbersome widget ordering process (filling out forms, Excel spreadsheets, tracking, statusing, fund allocation, etc.).
- *"I just like the 'usual'."*
- *"We like s**t to look cool."*-- discussing the perspective of millennials
- *"Everything I learned about CPOF was through trial and error."*
- *"You want me to just build this for you guys? When I heard there was a [Design Workshop] for the replacement for CPOF, I was like: 'Get me in on that right now!' as I closed my CPOF terminal."*
- "*I didn't know this much thought went into creating the software."*
- *"It's 2015!*" -- objecting to 4-week training requirement for DCGS-A.
- *"I think you should take the Apple® approach and make it super simple so you can't fail. It's all about keeping it simple."*
- *"We'll be modern combat fighters eventually."* -- discussing bandwidth, satellites, etc.
- *"Collaboration causes issues."*
- *"CPOF is like Pangaea. Good, but a million years ago. It's time to let all that stuff separate out."*
- *"Screen grabs on a paste board look like a 2 year-old did it."*
- *"I'm scared as hell of that thing, I don't want to f*** with that!"* (re: CPOF)
- *"Office products don't allow you to do what CPOF can like change and add a product. In Office, you copy or check in. CPOF is pretty cool for that."*
- *"Why's it always the Major?!"* (remarking on the fairness of Major Smith always owning all the products shown in the videos).
- *"Major Smith is paranoid."* (re: our video examples)
  - *"Bob and Joe are collaborating. Major Smith is the feudal lord."* (re: our video examples).
  - *"In the fog of war, you could plan the perfect plan but it won't last. To be able to actively push out 'hey I updated this' would be great."*
- *"Mirror, clone, replicate. [Functionality] similar to that would be ideal."*
- *"If I need their air corridor, I'd mirror it, so any changes they make I'll get. If it's an operational graphic, sometimes taking it and completely breaking the link can be helpful."*
- *"I hate engineers; they design cars but don't maintain [them]."*
- *"Today's army makes things a little more complicated than they actually are."*
- *"You could create a tutorial for each topic, if you want to do the walkthrough tutorial. I've seen this for games, like you've achieved certain things, [you] get this many points."*
- *"I can tell the people who just watched the IMI versus those who have taken the course."*

- *"[It takes] a reasonable amount of time—maybe a week long class—to learn a system like this."*
- *"The army's using a training matrix/table system now. It includes the basics of the job I'm doing now, and has lots of smaller pieces that you can do one at a time, and it tracks your progress as you complete modules."*
- *"Everything is competitive in the army."*
- *"If you guys could just make [TacApps] work on a laptop, that'd be great [instead of having to go to a specific computer]."*
- *"Civilization, the game, starts off with a tutorial but it also has a help menu… very visual. Have an option to turn on or off the tutorial."*
- *"When you get a new phone, it has a quick setup wizard. That works well."*
- *"I love Clippy!"* [User, re: Microsoft® Clippy, sarcasm uncertain].
- *"I don't like the computer talking but [I like] if I'm in a library and I can see the librarian open a chat session and help me."*
- *"Somehow I want to know what everyone else is doing."*
- *"I hate chat bot. I don't want somebody chatting me."*
- *"Phone games work well. Clash of Clans. It tells you 'yo—before you do anything, build a town hall' etc…"* (re: onboarding).
- *"CPOF cannot command and control. I cannot control my [stuff] through CPOF. It's a hell of a briefing tool though."*
- *"Warfighter function changes more frequently than staff function."*
- *"I'm an infantryman. It's bad news if I start making up my own call sign."*
- *"Unicorn slayer. That's what somebody's gonna put"* (re: The concept of self-designated skills being part of user identity).
- *"Special Skills: dangerous, people put all kinds of stuff. If a platoon leader needs a cement mixer, he is going to ask company if there is an engineering asset to task a cement mixer to the operation."*
- *"Staff function would be the shop you're in. Role is like S3 or CUOP."*
- *"Warfighter function in CPOF is what their job is, like map builder."*
- *"Oh, I want to be able to type. There better be somewhere for me to type. Give me a place to type!"* – (re: Wanting direct text input in addition to dropdown criteria by unit).
- *"I understand what they were trying to do with CPOF in the lab, maybe. It's so unusable."*
- *"[It would] be cool to have favorite users. Click on them and boom—see their stuff or talk."*
- *"An auto-populated most useful user list based upon the number of times I clicked on them."*
- [User's] examples of a hypothetical individual's self-assigned roles: *"In-flight missile repair' and 'Space shuttle door gunner."*
- *"I'm partial to horizontal scrolling."*
- *"We've seen guys taking their shirts off, ready to go at it because somebody jacked up their entire presentation right before a brief."*
- *"Most system users understand nothing's ever done—war moves so fast."*

- *"My experience with Army systems is that TacApps will take five years to go Army-wide."*
- [Two users] mention that they will be out of the military by the time this system likely deploys.
- *"Sometimes it's best not to allow these things to happen."*
- *"Permissions really suck."*
- *"This is going to be great!"*
- *"You could build a gun that shoots colored gerbils against white walls and it would be better than CPOF."*
- *"Users do not want to be injected with smart chips in their necks. What are we now, puppies?"*
- *"Keep it as close to what we work with. Windows®."*
- *"Two windows [side-by-side] -- I'd never have a need for that."*
- *"I'm a dismount so I'm not a computer guy."*
- *"The COP is the most important thing."*
- *"I want to deal with something that produces a record, so it's not just my word but there's a record of it."*
- *"CPOF is tough to understand because it's not like Windows®. But once you learn it, it can be OK."*
- *"Everyone in the military is familiar with Microsoft®."*
- *"Permissions are powerful but people don't understand them."*
- *"Embedding the help would definitely help."*
- *"TIGR sets a really good example for an easy-to-use system. I like being able to use the search tool by MGRS and that it highlights items/efforts/work products in that area."*
- *"Lots of Intel analysts use Google Earth®."*
- *"Backup! You know, it might seem like a really great idea, but it never happens."* (re: having an SOP-assigned backup for warfighter functions).
- *"CPOF would not work well on a tablet. Putting a map and efforts together and trying to edit them would not work."*
- *"The Army has a lot of different reports. A simple 'Create Event' button would be good. There are hundreds of doctrinal icons that nobody uses."*
- *"[In] CPOF right now, it takes so much time to enter things, like a SPOT report."*
- *"Here's the big problem; all the systems are supposed to communicate but in reality they don't. So we recreate stuff."*
- *"We're trying to move away from PowerPoint. The only reason we use PowerPoint is that all the systems can take them in. There's no other functionality or preference reason."*
- *"[User] likes the Ventrilo style online presence indicator of who's actively attending the brief."*
- *"Sharing the map is problematic because so many people would mess with it. [We've] had to move it to Brigade level. Causes bad tension."*
- *"If you're not trained to do something (CPOF), you won't figure it out."*
- *"The Trash bin is essential. I would like anything IN the trash to stop running. To get no updates and run no automation."*

- *"Task Org shouldn't change much, unless a lot of people die and they start combing battalions."*

Participants' Feature Requests

- Spellcheck (so they don't have to use MS Word)
- Ability to merge products/layers together
- Ability to templatize a product and modify as needed
- Search, with advanced filters, across the entire system of apps
- A training database, so that learners can't impact real products
- Configurable 'hot buttons' (hot keys)
- Self-paced User Guide within the system
- Ability to move the taskbar to anywhere it's convenient
- Tagging
- A universal, or at least group, login for convenience, followed by individual CAC login
- A banner on products: who the user is sharing with, or 'nobody' for transparency
- Hover-over on folders that displays official group contact info, like telephone numbers/email
- A database of templates
- Ability to send a Fragmentary Order (FRAGO) across many groups as an urgent notification
- Ability to import/export Google Earth KML files
- Enemy position that shows up on AFATDS and TacApps simultaneously
- Do NOT use spacebar to pan the map
- Combine BCS3 and [TacApps] functionality somehow
- A last modified who/when on all products
- Share/ import/export graphics
- A visual 'dif'; shows all changes on the map with different colors. Color-coded by person or by the time since the change… red for recent changes and green for the 'previous 24 hours'

New and Interesting Terminology from Participants

- *Common* (as in a shared map)
- *Check in and check out* (version control)
- *Send up / shoot up* (to a higher echelon)
- *Blast* (send wide, quickly and for crucial notifications)
- *MFWS* (multi-function workstation)
- *Wall* (for public sharing, like Facebook)
- *Squatting* (placing data in a unit's SOP-approved 'edit status' for too long)
- *Drive* (to control the briefing)
- *Permissions* (participants near-universally used this term rather than privileges)
- *Merge* (combine multiple products–or their layers–into one)
- *Living document* (a product with live data)
- *Feed* (as in 'to feed Battalion with information')
- *Dialog* (to talk)
- *Stalk* (to watch for changes on a piece of data or a product)
- *Instance* (a single version of a visualization)
- *Observe or participate* (briefing roles)
- *Everyday terms* (common language)
- *Orient* (to learn a map or visualization)
- *Bleed out* (how info spreads through a network of people or products)
- *Shared drive*
- *EDRE* (Emergency Development Response Exercise)
- *FEC* (Fire Engagement Cell)
- *Pull vs. push data*

Mention of C.O,T.S. Tools by Participants

Throughout the Design Workshop sessions, as participants described their ideal functionality (or even their most-disliked functionality) the design team scribes took note of the various commercial, off-the-shelf software tools that they used to illustrate their points. These mentions, tabulated below in a word cloud (in which the largest font indicates the highest number of mentions; 15 for PowerPoint), reveal the participants' familiarity with external systems. Taken in aggregate, this can provide insight into the design patterns that could provide the most broadly successful recognition if refused in TacApps.
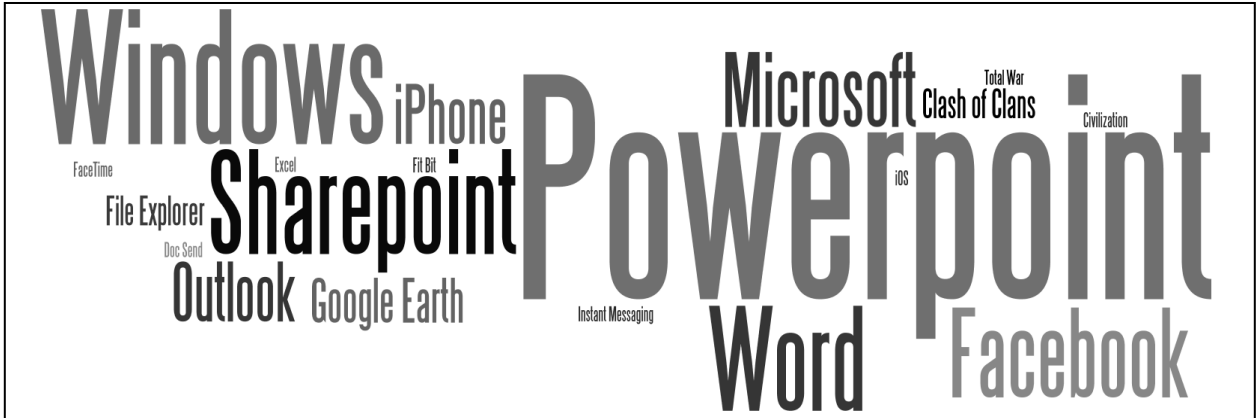
Popularity of Various COTS Tools as Described by the Participants in Their Own Words

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Title   Project

Ross Arnold
Author/Project Engineer   Report number/Date received (to be completed by LCSD)

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